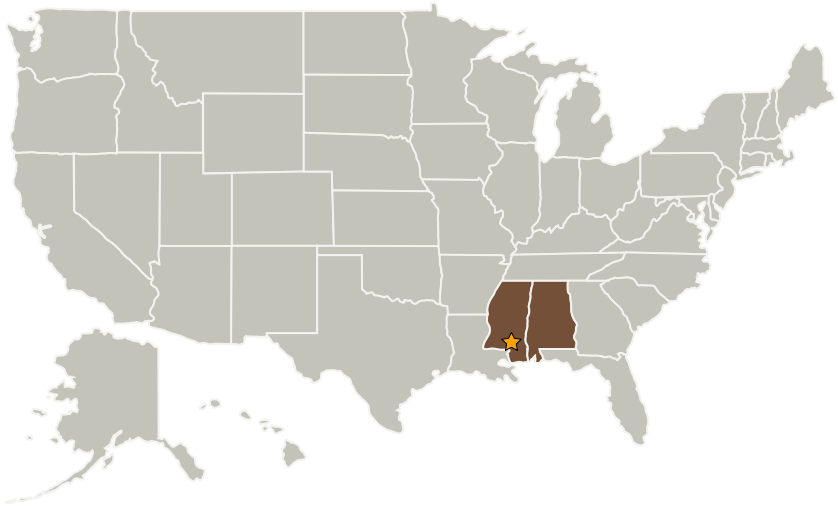
Engine Test Stand Design Constraints Expert System, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

Propulsion test stands are designed for thermal and pressure loads for certain classes of engines. These plume induced loads are: radiative heating, acoustics and direct impingement convective heating and pressure loads. Existing test stands will be used to test a wide variety of new propulsion systems, engines and engine components which will require the evaluation of the test stand design to handle loads that are a function of engine location, chamber pressure history and gimbaling. Existing models require large numbers of individual calculations to evaluate the various engine operating parameters. The Phase I effort will utilize existing models to develop a PC based test stand design constraints model that automatically determines engine operating limits for existing facilities. The Phase I effort will establish test stand design data base requirements, modify existing test stand environments models to automatically cycle through the entire range of engine operating parameters for a single design variable, and demonstrate the model for an existing stand. The Phase II effort expands the models capabilities for all design constraints and develops a CAD module for importing test stand design information. This effort is innovative in that it will greatly reduce the cost/time for testing new engine designs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Plumetech	Supporting Organization	Industry	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Mississippi

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sheldon M Smith

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic